About the same time Gaudry, Hébert, and Desnoyers also explored the same valley, and announced that the stone implements there were as ancient as the mammoth and rhinoceros found with them. Explorations in the Swiss lakes and in the Danish shell heaps added new testimony bearing in the same direction. In 1863 appeared Lyell's work on the "Geological Evidences of the Antiquity of Man," in which facts were brought together from various parts of the world, proving beyond question the great age of the human race.

The additional proof since brought to light has been extensive, and is still rapidly increasing. The quaternary age of man is now generally accepted. Attempts have recently been made to approximate in years the time of man's first appearance on the earth. One high authority has estimated the antiquity of man merely to the last glacial epoch of Europe as 250,000 years, and those best qualified to judge would, I think, regard this as a fair estimate.

Important evidence has likewise been adduced of man's existence in the tertiary, both in Europe and America. The evidence to-day is in favour of the presence of man in the pliocene of this country. The proof offered on this point by Prof. J. D. Whitney, in his recent work,[1] is so strong, and his careful, conscientious method of investigation so well known, that his conclusions seem inevitable. Whether the pliocene strata he has explored so fully on the Pacific coast corresponds strictly with the deposits which bear this name in Europe, may be a question requiring further consideration. At present the known facts indicate that the American beds containing human remains, and works of man, are at least as old as the pliocene of Europe. The existence of man in the tertiary period seems now fairly established.

In looking back over the history of palæontology, much seems to have been accomplished, and yet the work has but just begun. A small fraction only of the earth's surface has been examined, and two large continents are waiting to be explored. The "imperfection of the geological record," so often cited by friends and foes, still remains, although much improved, but the future is full of promise. In filling out this record America, I believe, will do her full share, and thus aid in the solution of the great problems now before us.

I have endeavoured to define clearly the different periods in the history of palæontology. If I may venture, in conclusion, to characterise the present period in all departments of science, its main feature would be a *belief in universal laws*. The reign of Law, first recognised in the physical world, has now been extended to Life as well. In return, Life has given to inanimate nature the key to her profounder mysteries—Evolution, which embraces the universe.

What is to be the main characteristic of the next period? No one now can tell. But if we are permitted to continue in imagination the rapidly converging lines of research pursued to-day, they seem to meet at the point where organic and inorganic nature become one. That this point will yet be reached I cannot doubt.

THE EFFECT OF SUNLIGHT UPON HYDROGEN PEROXIDE[2]

WE believe that it has not been previously observed that hydrogen peroxide in solution is decomposed by sunlight; it may therefore be of interest to state that during the continuation of our investigations on the chemical effects of sunlight, we found that (1) after about ten months insolation aqueous solutions, containing about 8 per cent. of hydrogen peroxide, were entirely destroyed, and that (2) corresponding solutions shielded from light proved much more stable than is commonly supposed. We are inclined to think that the insolation needs to be prolonged—although we have made no direct observations on this point—because some of the solution, exposed in a thick glass bottle standing in a window, was found to be still of considerable strength after a period sufficient to destroy a corresponding sample in a thin test-tube.

We have elsewhere[3] shown that oxalic acid is destroyed by sunlight by the oxidation of its hydrogen by *external* oxygen, thus:—

$$C_2O_4H_2 + O - = 2CO_2 + H_2O.$$

There is not, we believe, any analogy whatever between that case and this. There we have the "chlorous radicle" C_2O_4 in combination with the basylous H_2, the latter being seized upon by the superior affinity of the external oxygen stimulated under sunlight. Here we may regard the hydrogen peroxide as made up of two atomic groupings of the chlorous radicle HO and, if the theory we suggest be correct, the decomposition in this case is brought about by the dissociation of these radicles. We believe that the tendency of sunlight is to dissociate (or "weaken the internal bonds" between) what we have termed "chlorous radicles," whether these be simple, as oxygen or chlorine, or compound as HO, and thus to promote their combining energy, or to bring about a more stable arrangement of their constituent atoms.

THE FRENCH ASSOCIATION

AMONG the addresses at the Montpellier meeting we must notice that of Col. Laussedat, on geography considered from the point of view of protecting national independence, and on the creation of a French Signal Corps, in imitation of the well-known United States organisation.

M. Broca arrived just in time to give information relating to the Congress of Anthropology which had taken place in Moscow, and at which he had assisted with eleven other French *savants*. The expenses of the journey were paid by the Moscow Anthropological Society and by private donations. The session, the proceedings of which will appear in the *Journal des Missions du Ministère de l'Instruction publique*, and were reported in several French papers, lasted twelve days. M. Quatrefages was considered the head of the party, and gave in their name the loyal Russian toasts in the Kremlin. It is the first time that French *savants* have been entertained in this historical edifice, which was burnt to thwart the designs of the great French conqueror.

M. Chauveau, the Director of the Veterinary School of Lyons, was elected the President for the exceptional meeting at Algiers. The Secretary appointed for this occasion was M. Maunoir, the Permanent Secretary of the Geographical Society of Paris. This election shows that geographical questions will take a prominent place in April, 1881, at the capital of the French colony in North Africa. Much will be heard of the Transaharian, and it is expected that work will be begun on a large scale in the desert on this occasion. The nomination of M. Chauveau took place against the wish of the Council of the Society, who had presented as their candidate M. Baillon, the author of the Botanical Dictionary. The appointment of M. Chauveau is considered as a protest against the Haeckelian tendencies of the committee and a revival of the old Montpellier vitalist opinions. At all events, it has created some sensation.

The meeting for 1880 will take place in Rheims, as usual in the month of August, and is sure to be attended by a number of foreign visitors. Great preparations are being made by the local committee to give to the guests an unprecedented reception and to impress upon them a great idea of the peculiarities of the city.

SPECTROSCOPICAL OBSERVATIONS OF SHOOTING STARS

PROF. VON KONKOLY, of the Astro-physical Observatory of O-Gyalla (Hungary), contributes an interesting paper on the spectra of shooting stars to a recent number of the *Astronomische Nachrichten*, from which we note the following data:—On July 26 and 28, and again on August 12 and 13, the Professor had the opportunity of observing some bright shooting stars spectroscopically, and, with a few exceptions, he arrived at the result that the heads of shooting stars give a continuous spectrum generally, upon which very often the bright sodium line appears projected. Since this, however, is not always the case, Prof. von Konkoly inclines to the belief that considerable differences of elevation exist amongst shooting stars, and that those which do not show the sodium line are travelling in very much higher regions than those which do show the line in question, since he looks upon the sodium line as not belonging to the shooting star itself, but as resulting from the atmospheric air which the meteorite condenses and renders incandescent. It is evident that in very high regions there must be very much less (if any) chloride of sodium suspended in the atmosphere than in lower strata.

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[1] "Auriferous Gravels of the Sierra Nevada of California." 1879.

[2] By Arthur Downes, M.D., and T. P. Blunt, M.A.

[3] *Proc.* Roy. Soc., vol. xxviii. p. 204.

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In the spectra of some of the July meteors a red line was also observed, but a blue one was looked for in vain; yet the professor would not deny that the red line in question may have been a potassium line and that the blue $K\beta$ was simply overlooked on account of its extreme weakness.

The meteors observed on August 12 and 13 resembled those observed in July in almost all details. Thus a yellow meteor of the first magnitude was observed, which evidently originated from the Perseus radiating point. In the spectrum of the head of this meteor, besides the bright sodium line, the lithium lines were distinctly visible; three seconds later another meteor of about the second magnitude passed through the field of the spectroscope in a direction exactly parallel to the former one, and the spectrum of both head and tail in this case was simply a tolerably bright continuous one, without any appearance even of the bright sodium line.

At 10h. 46m. 10s. Prof. von Konkoly saw a magnificent meteor in the north-eastern sky; it moved very slowly, its colour was emerald green, its brilliancy equal to that of Jupiter; he at once directed his spectroscope towards it. At the first appearance the head showed the sodium line only, but soon a number of lines were seen in the green and blue, of which one was recognised as a magnesium line, while others were suspected to be copper lines. There were also two faint lines visible in the red. On August 14 several other meteors were observed with the spectroscope, but only one was seen in the spectrum of which a faint red line appeared besides the sodium line; of these meteors several were of the first magnitude and did *not* show the sodium line; other ones of a lesser magnitude showed the sodium line very brightly besides a continuous spectrum more or less brilliant.

At the same observatory two stationary meteors were observed: one by Capt. von Reviczky on July 26, at 11h. 48m. O-Gyalla mean time (position: 2h. 0m. R.A and 29° 0′ decl. N., magnitude 3); the other by Herr J. Rosenzweig, the assistant at the observatory, on August 11 at 9h. 47m. 1s. O-Gyalla mean time (position: 2h. 14m. R.A. and 55° 18′ decl. N., magnitude 3).

The total numbers of shooting stars of the two showers referred to, which were observed at O-Gyalla were as follows:—

		Meteors.
July	25	72
,,	26	87
,,	28	26
August	11	110
,,	12	50
,,	13	50
,,	14	35

UNIVERSITY AND EDUCATIONAL INTELLIGENCE

THE Calendar of the Yorkshire College for the sixth session (1879–80) has just been published. It appears this year for the first time in stiff covers, and with the prospectus of the Leeds School of Medicine makes a book of 204 pages. The growth in the size of the calendar corresponds with the extension of the College curriculum, for several new classes are announced for the approaching session, which begins on October 7 next. Mr. W. Philp, M.A., B.Sc., has been appointed mathematical and classical tutor, and the College authorities have thus been able to arrange for a systematic oversight of students who are preparing for the examinations of the University of London. The Natural Philosophy lectures are now arranged in two courses. The first year's course comprises the requirements for London Matriculation, viz., Mechanics, Optics, and Heat; the second year courses, those for the B.A. and other degrees, viz., Mechanics, Heat, Acoustics, Light, Electricity, and Magnetism. The Chemistry Classes remain the same as last year. Students have the privilege of pursuing a course of practical chemistry in the laboratory at times convenient to themselves, and for such periods as they are able to devote to that study. The Saturday morning chemistry lecture and practical class are to be continued, schools and teachers having largely availed themselves of this opportunity in past sessions. The arrangements and the classes in Mathematics, Geology and Mining, Biology, Zoology and Comparative Anatomy, Botany, Civil and Mechanical Engineering, Latin, Greek, French, German, Oriental Languages, Coal Mining, and Textile Industries remain for the most part unaltered, but the important subject of Mental and Moral Science has been added, Logic being taken in the earlier part of the session, and Psychology in the later part. The classes in Modern Literature and History have been multiplied and rearranged, so as to give a complete course in Literature and History for the London Matriculation and 1st B.A. examinations, a complete course on the special subjects in Literature and History for the Cambridge Higher Local examination, and a course of History for the Cambridge Senior and Junior Local examinations, besides other classes for students not reading for examinations. The fees in some of these classes are fixed on a very low scale, to meet the requirements of teachers and others preparing for the University Local examination. This is an endeavour to extend the usefulness of the college, which will, no doubt, be warmly appreciated by the large class of persons directly affected by it. The department of Textile Industries continues to receive the attention it deserves, and although the students cannot be located in their new premises at Beech Grove at the opening of the Session, as had been hoped, their interests have been amply provided for in the temporary class rooms and in the weaving annexe in Cookridge Street. The practical value of the instruction given by Mr. Beaumont is widely recognised, and we observe that the committee are doing what they can to impress on the students in this department the value of a thorough acquaintance with the most important branches of textile manufacture. Arrangements for the establishment of a school of dyeing are in an advanced state. In the evening classes there are to be courses of lectures on Mechanics, Chemistry, Geology, Biology, Botany, and Engineering, and classes in Latin, Greek, English Grammar, and Textile Industries. A somewhat bold experiment is to be tried by the introduction of two short courses of lectures of a more popular character than the ordinary evening class lectures.

MR. T. JEFFERY PARKER, B.Sc., Demonstrator of Biology in the Royal School of Mines, has been appointed to the new lectureship on Biology at Bedford College, York Place, Portman Square.

THE City and Guilds of London Institute for the Advancement of Technical Education have issued a detailed programme of subjects in which examinations will be held in 1880. It embraces a great variety of subjects, in the more scientific of which some eminent men of science have been obtained as examiners. Any one interested in the matter will, no doubt, obtain a copy of the programme by applying to the Secretary, Mercers' Hall, E.C.

M. JULES FERRY has published a regulation tending to diminish the importance given to the *Compositions des Prix* in the several French educational establishments and to shorten the time assigned to the young competitors for writing their essays. Much dissatisfaction is felt by teachers and the best pupils at Government trying to repress the sense of emulation. It is expected that petitions will be sent to the French Parliament protesting against the supposed retrograde step taken by the Administration.

SCIENTIFIC SERIALS

Annalen der Physik und Chemie, No. 7.—In the opening paper, on electric limiting layers, Prof. Helmholtz studies the case where there is a difference of potential at the limiting surface of two different bodies, giving, along this surface, what he calls an "electric double layer," as, *e.g.*, when a zinc and a copper plate, in metallic connection, are approximated to each other. He groups together, in this relation, the phenomena of metallic electrodes in an undecomposed electrolyte, frictional electricity, flow of liquids on solids, and applies an explanation of the last-named case to various recorded phenomena of electrical action in liquids.—Herr Beetz describes a new investigation of the heat-conducting power of various liquids. The differences in this property, according as the temperatures were above or below 20°, are made manifest, and the discrepancies of previous data in part explained. The phenomena of heat conduction in liquids are considered to depend on mechanical molecular processes, or friction phenomena, as Kohlrausch has shown to be the case with electrolytic conduction.—A paper by Herr Barus treats of the thermo-electric position and electric conductivity of steel in its relation to hardening. He shows that the steel bars examined fell into two classes, those of the one class (the harder) being electro-negative to copper, those of the other (the softer) electro-positive. A simple method of classing steel is deduced from this.—In a second communication on experimental determination of

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